Delhi Supergroup

Presentation by

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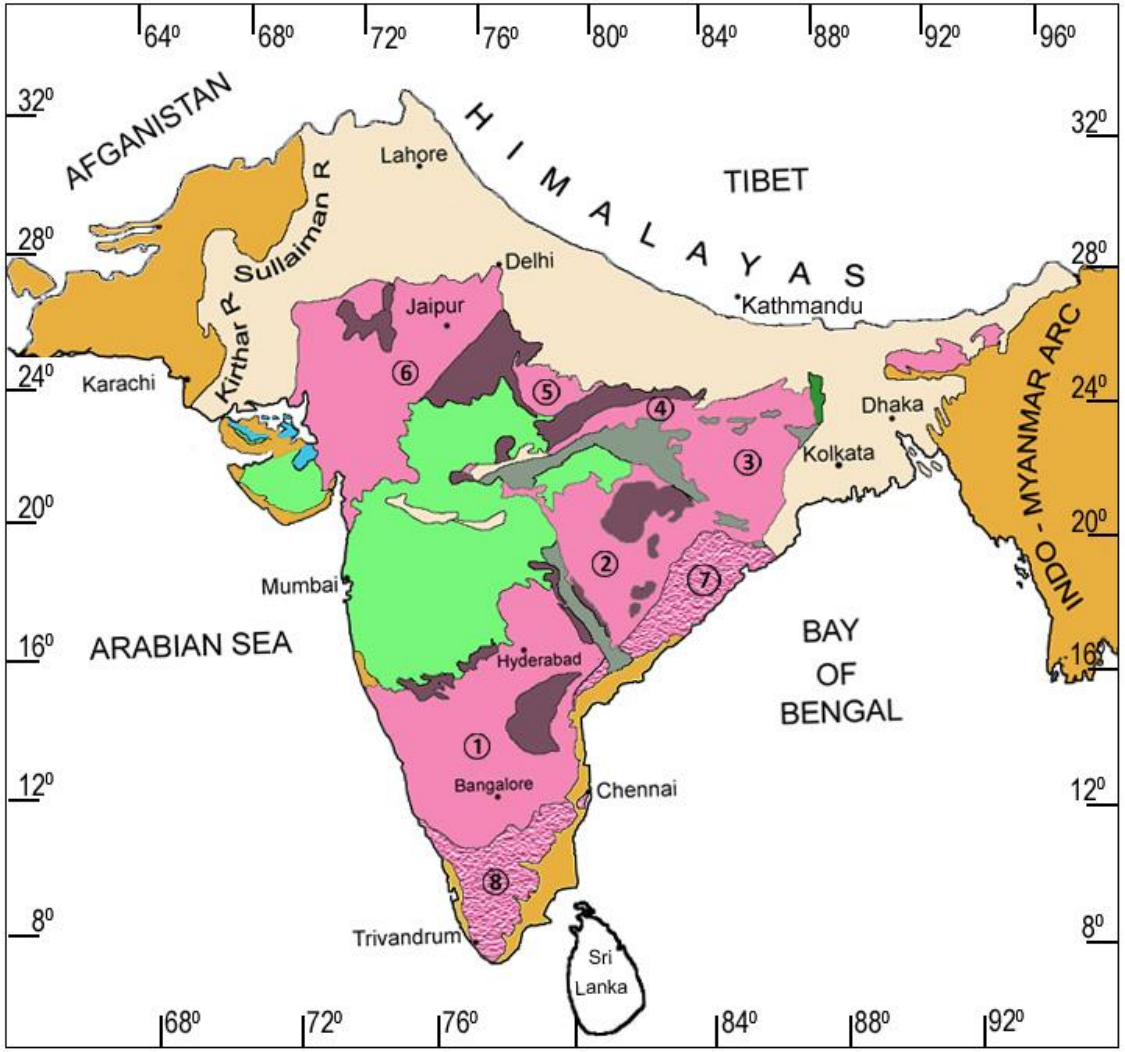
Precambrian rocks of the Indian Shield is made of several Protocontinents and accreted terranes

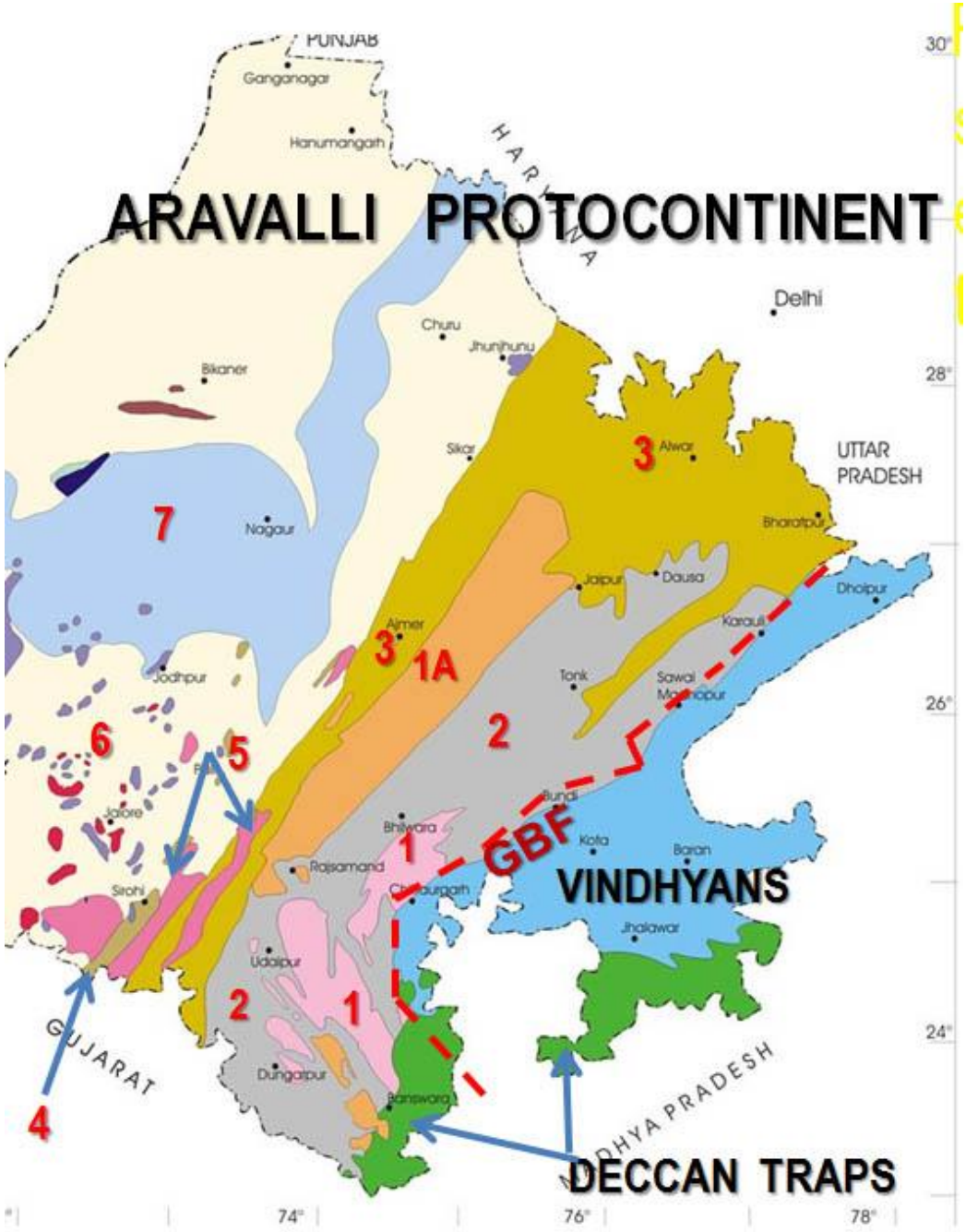


Protocontinents

1. Dharwar
2. Bastar
3. Singhbhum
4. Rajmahal
5. Bundelkhand
6. Aravalli

Accreted terranes

7. Eastern Ghats Granulite Belt
8. Southern Granulite Belt



Aravalli Protocontinent constitutes of -

7. Marwar Supergroup
6. Malani Group
5. Erinpura Granite
4. Sirohi Group
3. Delhi Supergroup
2. Aravalli Supergroup

1,1A Archaean Basement (partially reconstituted)

Stratigraphic succession of the Aravalli Mountains according to AM Heron & colleagues

Malani rhyolites

Jalore & Siwana granites

Erinpura granite

Puranas (=Algonkian) Delhi system

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Eparchaean Interval Raialo series

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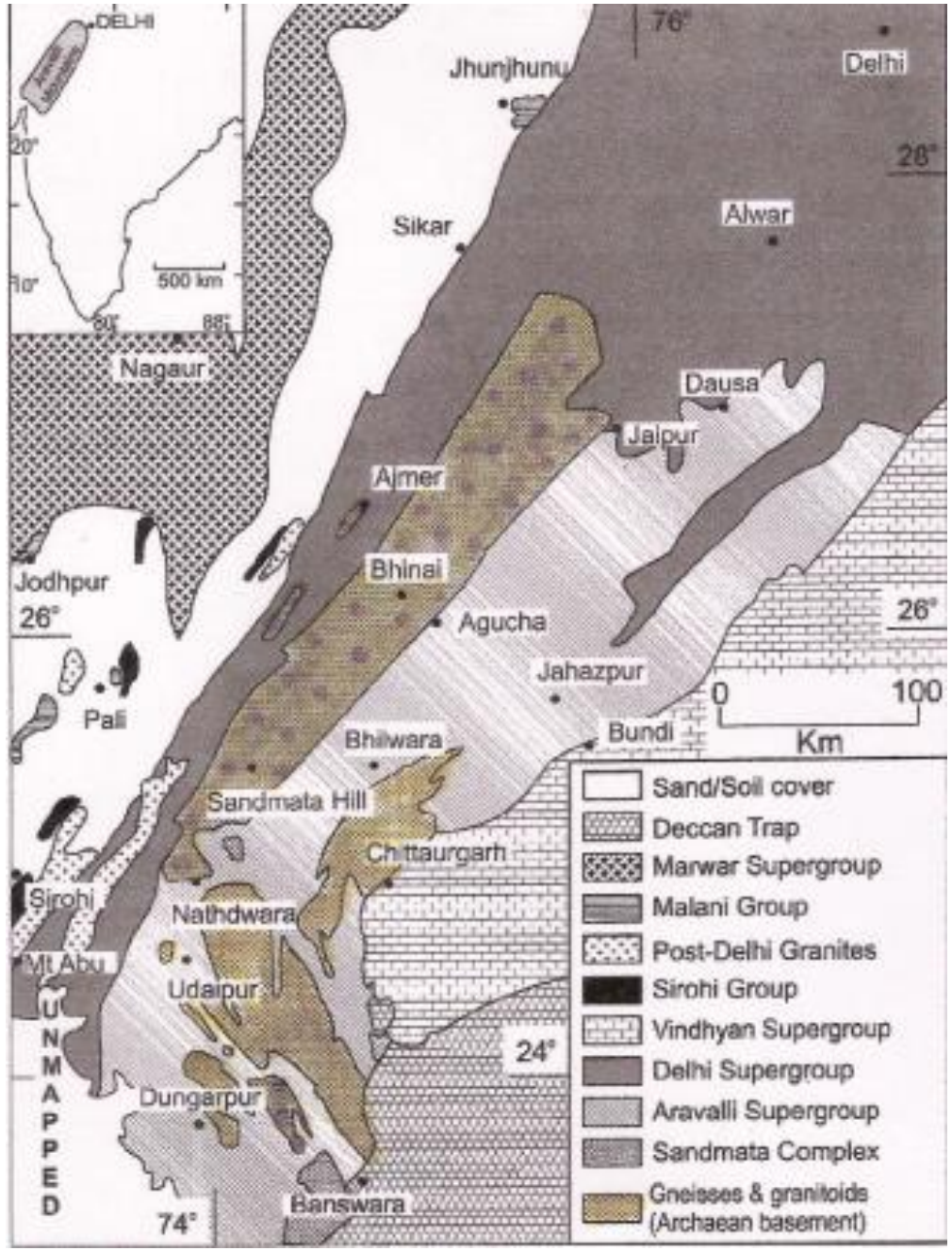
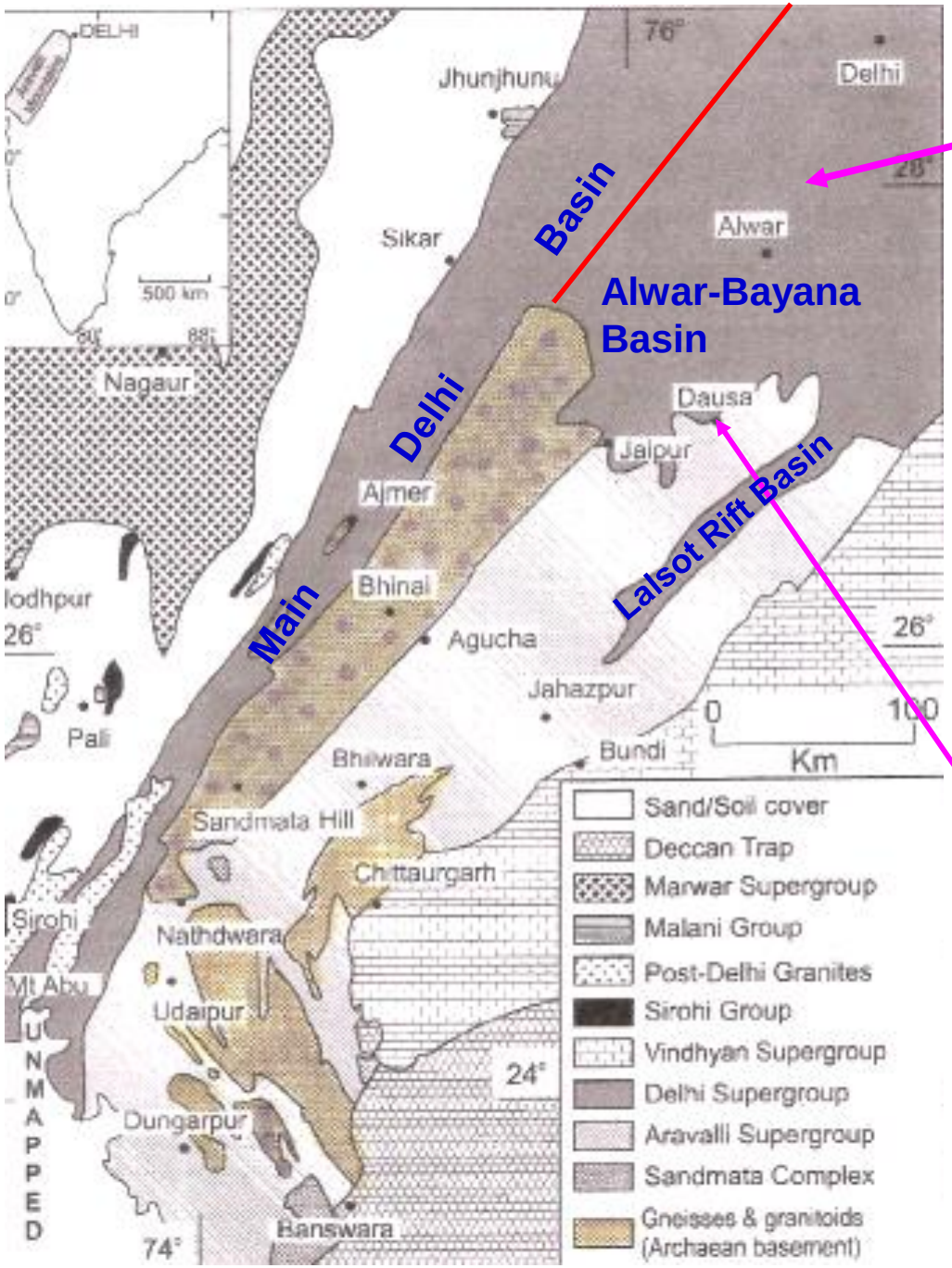
| Post-Aravalli, pre-Delhi granitoids

Archaean | Aravalli system

| BGC, Bundelkhand gneiss


DELHI
Aravalli Mountains
20°
10°
500 km
Jhunjhunu
76°
Delhi
26°
Sikar
Alwar
Nagaur
Dausa
Jaipur
Ajmer
Bhinai
Jodhpur
26°
Agucha
26°
Jahazpur
0
100
Km
Pali
Bundi
Bhilwara
Sandmata Hill
Chittaurgarh
Sirohi
Nathdwara
Mt Abu
Udaipur
UNMAPPED
24°
Dungarpur
Banswara
74°
Sand/Soil cover
Deccan Trap
Marwar Supergroup
Malani Group
Post-Delhi Granites
Sirohi Group
Vindhyan Supergroup
Delhi Supergroup
Aravalli Supergroup
Sandmata Complex
Gneisses & granitoids
(Archaean basement)

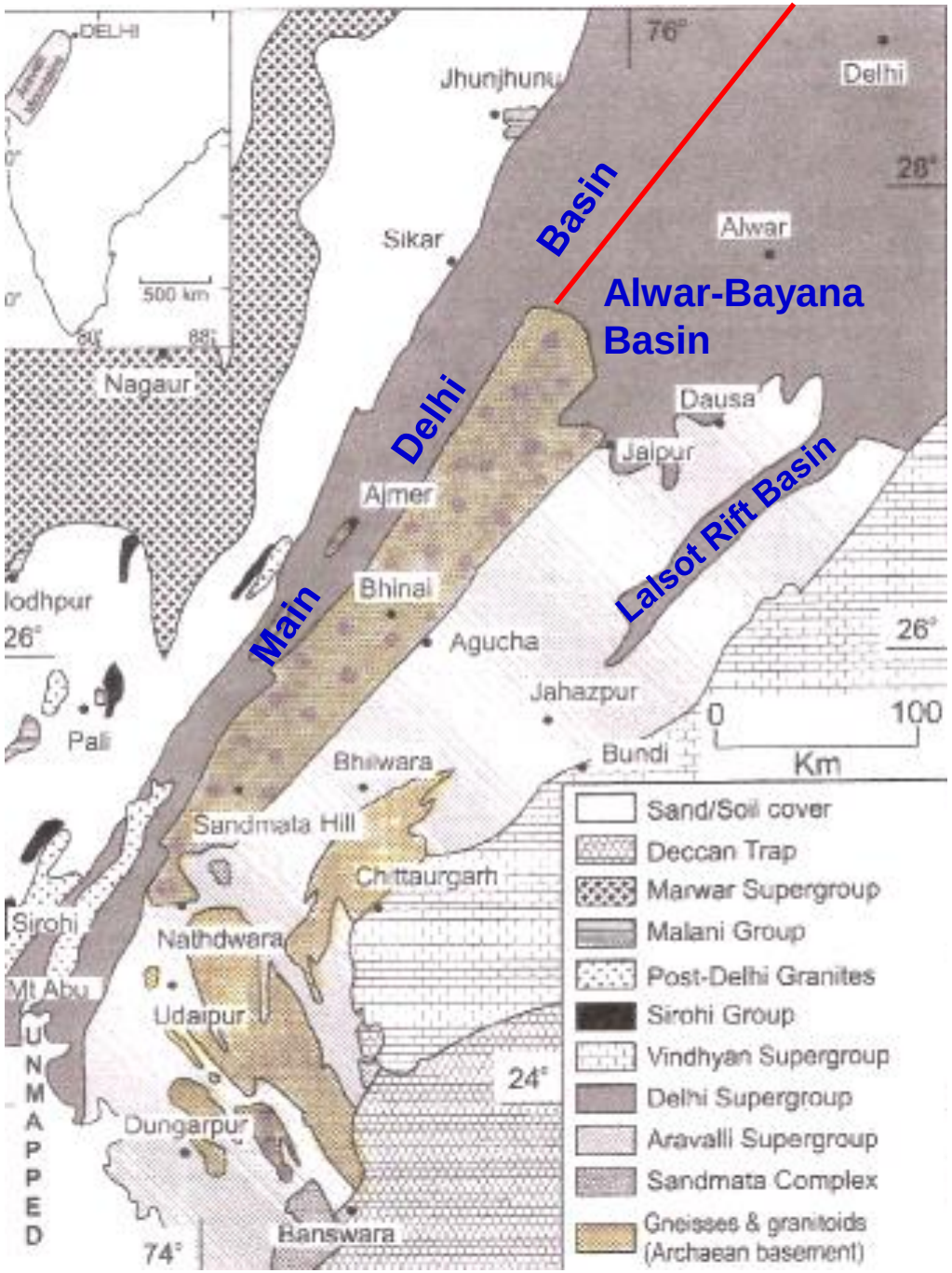


➔Delhi Fold belt forms the backbone of the Aravalli Mountains. It occurs as fan-shaped outcrop with a long handle

➔The belt comprises

- 1. Alwar-Bayana Basin
- 2. Main Delhi Basin
- 3. Lalsot Rift Basin

➔Unconformable relationship with the pre-Delhi rocks only in the south-eastern part.



Stratigraphic succession of Delhi Supergroup in the Alwar Sub-basin

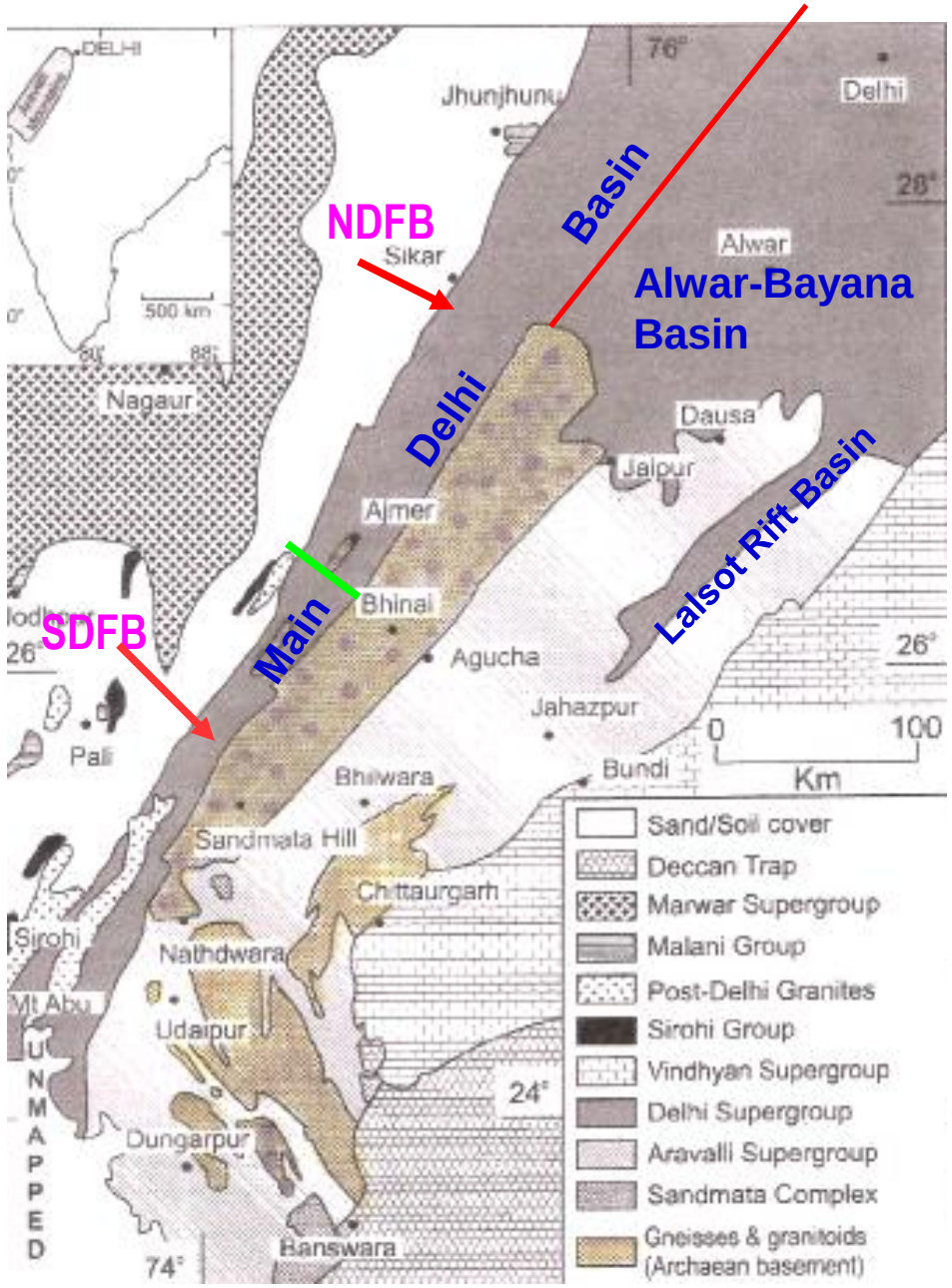
Ajabgarh Group

Alwar Group

Rayanhala Group

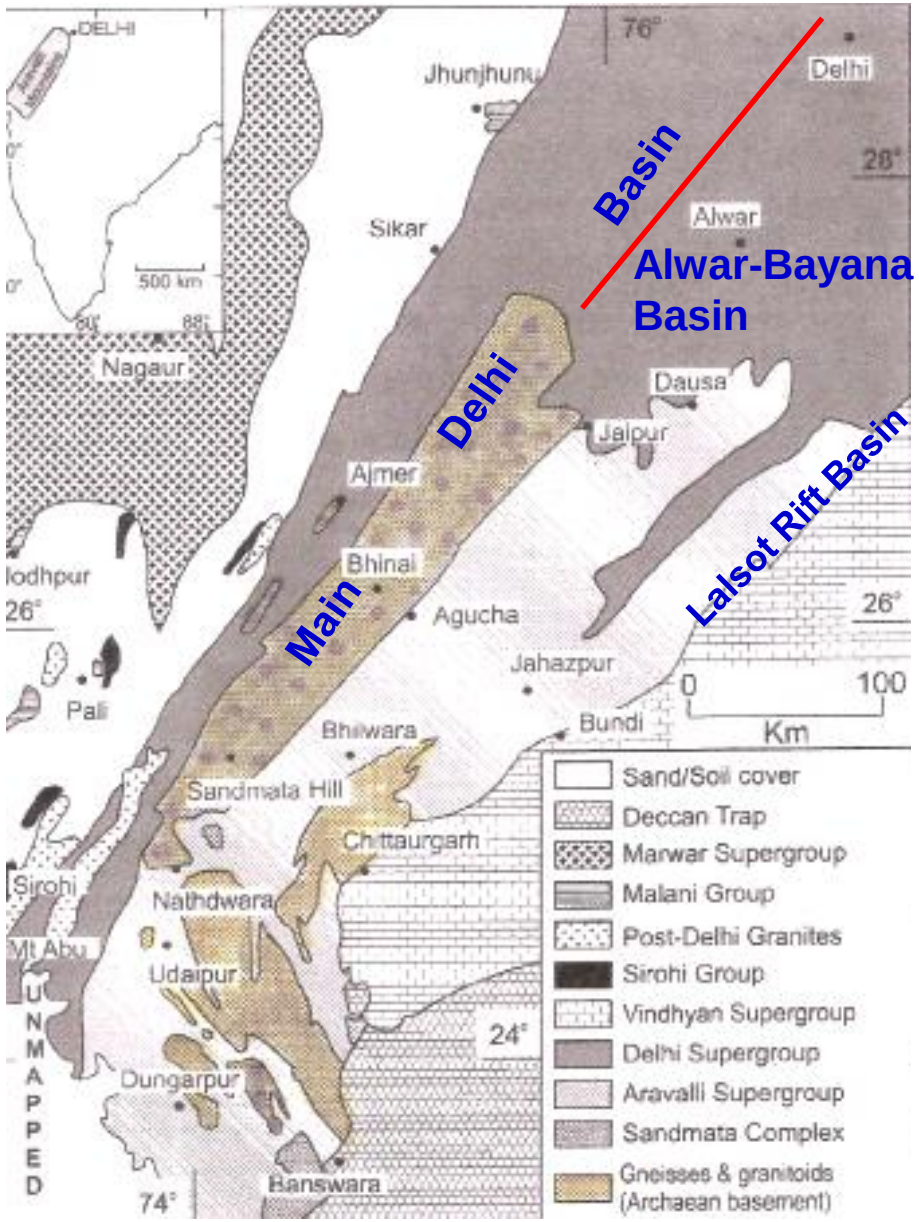
Term ‘Rayanhala’ replaces Heron’s original ‘Raialo’ described from Alwar.

The term ‘Raialo’ became corrupted once it was extended for any formation having apparent lithological similarity with the ‘Type rock’



Suggestion has been made dividing Delhi Basins into an older North Delhi Fold belt and a younger south Delhi Fold belts.

The division is arbitrary, without having any precise geological basis.
As on today there is no acceptable stratigraphic succession for the entire Delhi basins.



Uniform in pattern of polyphase folding & metamorphim suggests evolution of Delhi Fold Belt as single cycle orogeny through opening of isolated basins. Basins were later conjoined during orogenic closing at 1450 Ma.

The belt suffered repeated thermal reactivation during ~1000 Ma, 850 Ma & 750 Ma

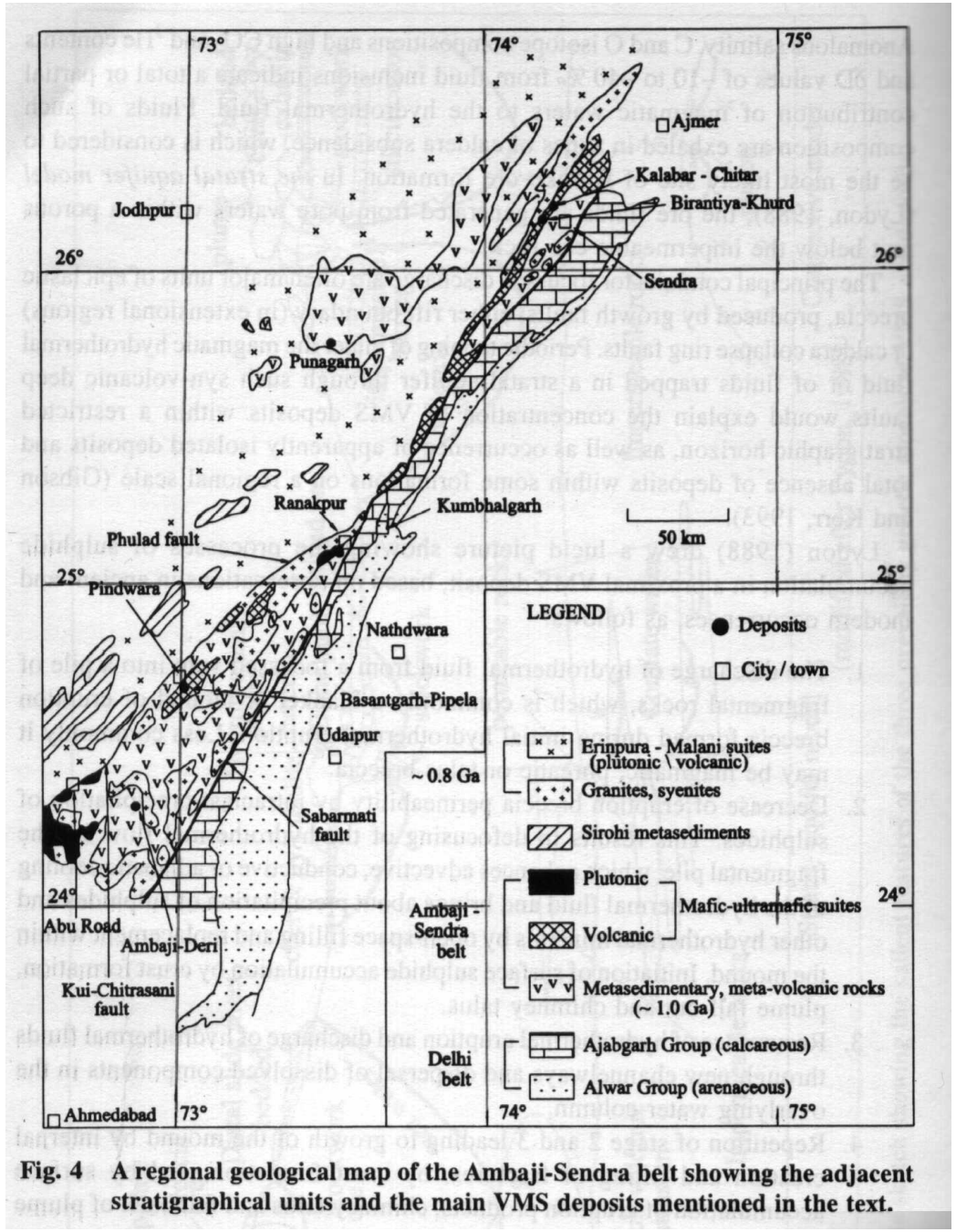


Fig. 4 A regional geological map of the Ambaji-Sendra belt showing the adjacent stratigraphical units and the main VMS deposits mentioned in the text.

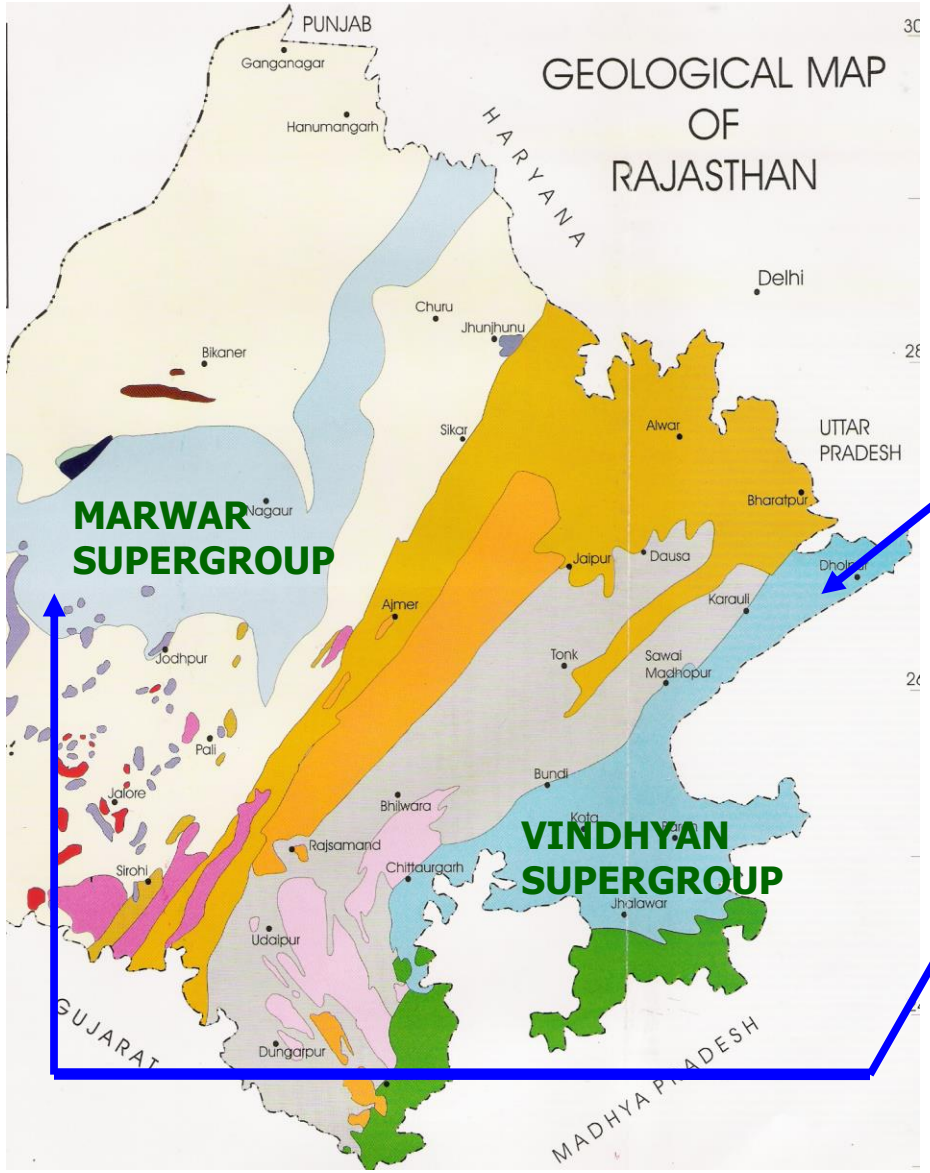
- **Delhi Basins (both older and younger components)** which opened in isolated **extensional rifts** show a common pattern of **polyphase folding & metamorphism**.

- Older basins were later conjoined during orogenic closing at **~1400 Ma**. One such Granite in South Delhi Terrane was **Bhula Granitic-gneiss** which acted as basement for the new basins.

- **One such basin** was between Pindwara and Aburoad where carbonates show different **heavy carbon isotope character** (~Riphean succession, Siberia- +4 permil 13C) in comparison to the carbonates of the older basin Delhi basin (~ N. China Platform carbonates- Zero permil 13C). The younger basins (southern) underwent repeated thermal reactivation and overprinting during **~1000Ma, 850Ma & 750Ma**

- The ~1400 Ma ‘age’ reflects thermal reconstitution of the pre-existing rocks similar to the ~1000 Ma ‘age’ reported from wide areas of the Aravalli Mountains which reflects thermal reconstitution of all the pre-existing Crust.

- These two thermal events reported from the Delhi Supergroup rocks consequentially led to the opening of **two successive ‘Ephemeral basins’** (short lived) formed west of Main Delhi Basin for deposition of **Pindwara-Aburoad metasediments (~1300-1100 Ma)** and **Sirohi Group metasediments (~900-850 Ma)**

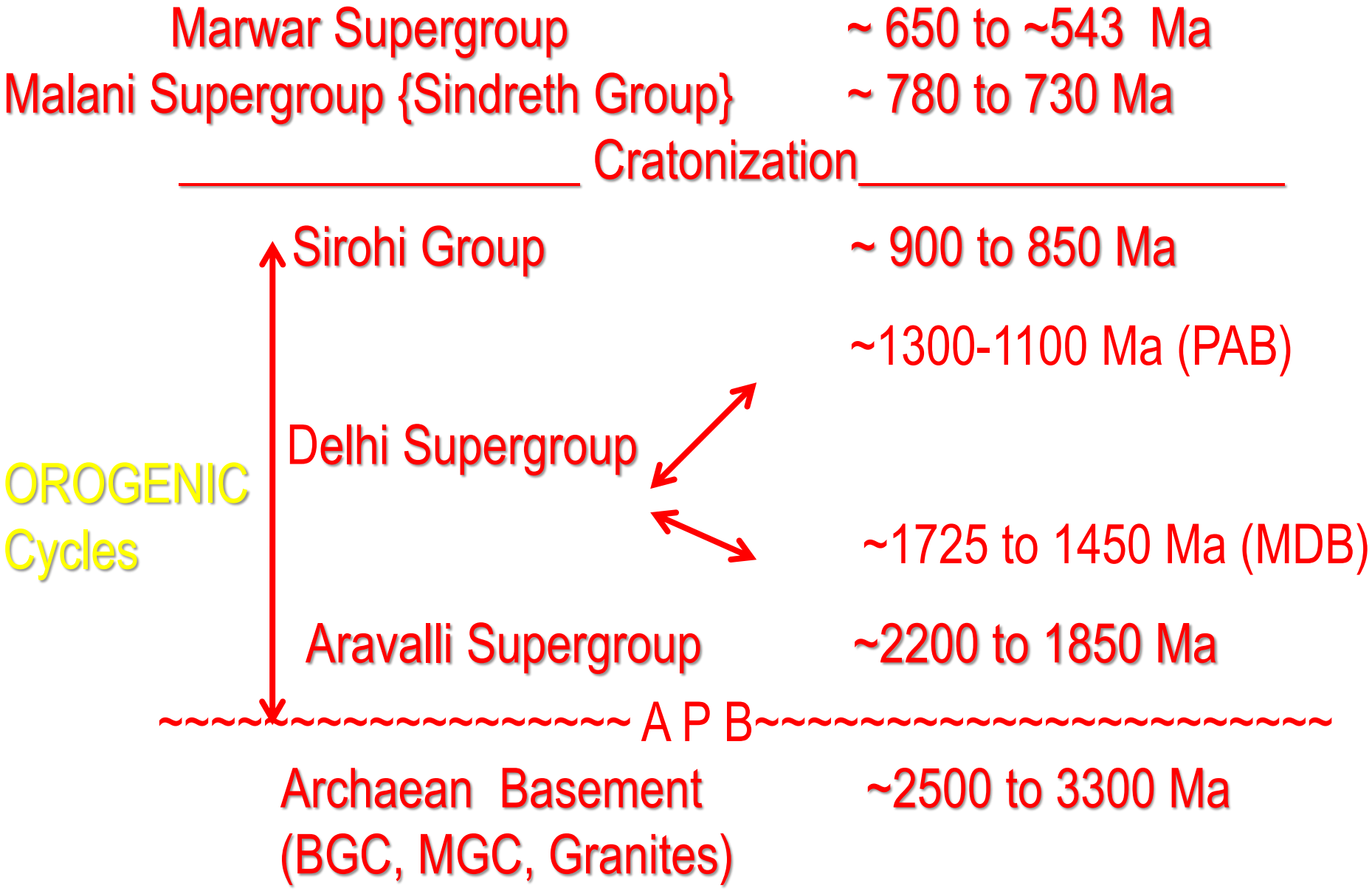


➔ **Two stable cratonic basins formed on either side of the Aravalli Mountians at different times.**

➔ **The eastern basin with VINDHYAN SUPERGROUP evolved earlier, might be coevally with the Delhi basins**

➔ **The western basin is the MARWAR SUPERGROUP which over lies the Malani Group. This is the youngest Precambrian Stratigraphic ensemble flanking Aravalli Mountains**

Summary of Stratigraphic and Geochronologic framework



Precambrian Geochronological framework of Aravalli Mountains and neighbourhood

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Marwar Supergroup	650-540 (?) Ma
Malani Group {=Sindreth Group}	780-66 Ma
Erinpura granite	*ca* 850 Ma
Sirohi Group	
Synorogenic granites in Delhi Fold belts	*ca* 1450 Ma
Delhi Supergroup	
Granulite exhumation in Sandmata complex	1725-1645 Ma
Darwal Granite {=AF1}	*ca* 1900 Ma
Aravalli Supergroup	
Basement Gneisses & granites	2500 Ma to 3300 Ma